



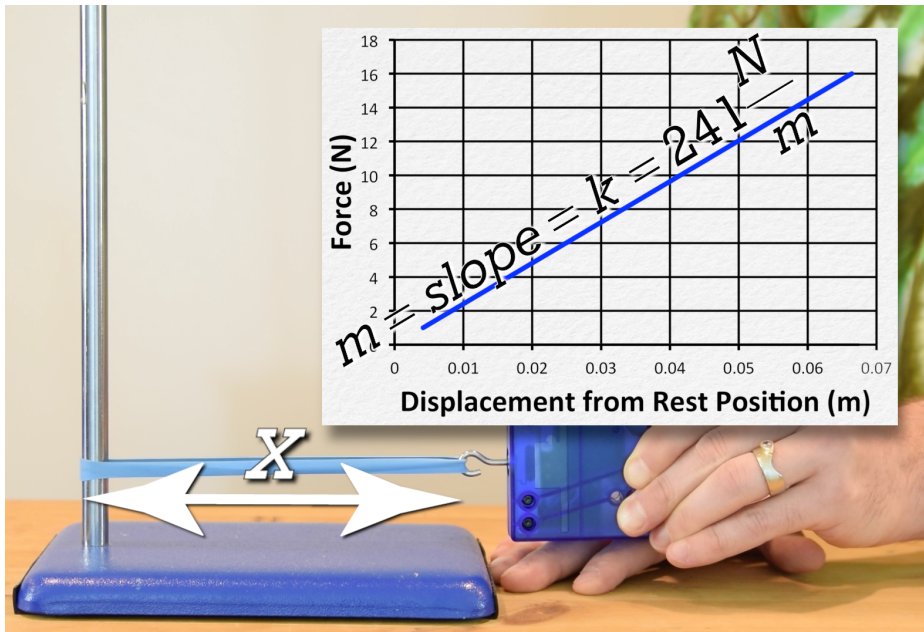
Flipping Physics Lecture Notes:

Introduction to Elastic Potential Energy with Examples

Elastic Potential Energy:

- The symbol is PE_e (or U_e).
- The energy stored in an object due to the temporary deformation of that object.
- $PE_e = \frac{1}{2}kx^2$
 - Spring Constant, k , usually in $\frac{N}{m}$, is how much force it takes to compress or expand the spring per meter.
 - x is displacement from equilibrium position (or rest position).
 - Equilibrium position (or rest position) is where the force of the spring equals zero.
- Because k can't be negative and x is squared, PE_e can never be negative.
- Like Kinetic Energy and Gravitational Potential Energy, PE_e is a scalar.
- The dimensions for Elastic Potential Energy:
 - $PE_e = \frac{1}{2}kx^2 \Rightarrow \left(\frac{N}{m}\right)m^2 = N \cdot m = \text{joules, } J$

Determining the Spring Constant of the spring:



Example: $k = 241 \frac{N}{m}$ & $x = 0.12 m$; $PE_e = ?$

$$PE_e = \frac{1}{2}kx^2 = \frac{1}{2}(241)(0.12)^2 = 1.7352 \approx \boxed{1.7 J}$$